



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8**

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Ref: 8EPR-SR

January 31, 2011

**MEMORANDUM**

**SUBJECT:** Review of draft Field Modification #4, Libby OU3 Phase IVA Sampling and Analysis Plan

**FROM:** Bonnie Lavelle  
Remedial Project Manager  
Libby Asbestos Site, OU3

A handwritten signature in black ink, appearing to read "Bonnie Lavelle", is written over the printed name and title of the sender.

**TO:** Site File

The attached documents summarize the basis for Field Modification #4 to the Libby OU3 Phase IVA Sampling and Analysis Plan and review comments received by EPA from Remedium and their contractor, MWH.

LIBBY SUPERFUND SITE OPERABLE UNIT 3  
PHASE IV SAMPLING AND ANALYSIS PLAN

ATTACHMENT A  
Revision 2

ACTIVITY BASED SAMPLING (ABS) SCRIPTS

This Attachment describes the activities to be performed by individuals performing each of the ABS scenarios described in the Phase IV-A Sampling and Analysis Plan (SAP). Details on the number, location, and timing of ABS sampling events are provided in the Phase IV-A SAP.

SCRIPT 1: RECREATIONAL VISITORS ALONG LOWER RAINY CREEK

Recreational visitors along lower Rainy Creek (between Highway 37 and the W.R. Grace property line) may engage in activities such as hiking and antler hunting that could disturb LA in source material (soil, dried stream-side sediment, and duff). The following script will be used to simulate exposures during activities that are considered to be representative of recreational visitors along lower Rainy Creek south of the W.R. Grace property boundary.

For this scenario, Rainy Creek south of the W.R. Grace property boundary will be evaluated as a single ABS study area. ABS sampling will be performed by a team of two individual samplers. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

The team of two samplers will walk from the security gate on Rainy Creek Road to Rainy Creek. Once at Rainy Creek, the two samplers will turn on their sampling pumps. This will be time = 0. Both individuals will then begin to walk up along the banks of the creek, disturbing bushes and other vegetation as needed to move along the bank of the creek. Activities will include the samplers using their hands to push aside ground vegetation to simulate hunting for antlers. To the extent possible, the samplers will cross back and forth across the creek several times so that the ABS activities represent exposures to disturbed sediments and brush on both sides of Rainy Creek.

After 30 minutes moving up the drainage, the two samplers will change positions so that the sampler originally in the lead will be in the following position. The team will then make their way back down the drainage toward the starting point. After 30 more minutes (for a total of 60 minutes), the ABS event ends and the air sampling pumps are turned off and the air sampling cassettes are capped.

Conversation w/

Bill Bratten

9/30/10

2

- ~~SLASH~~ PILES BURNED  
ON SAFE DAY IS OK  
✓ AS LONG AS IT'S SAFE

WE AGREED TO  
SECURITY

LIGHT THE FIRE  
LOCATED IN DW

DIRECTION 1ST  
TO MINIMIZE

AIRBURN EFFECTS

- AGREED TO  
REDOUBT OF  
PURPS ON  
ABS SAMPLERS

✓ TO 1 AT  
4 LPM -

PILOT TEST  
INDICATED THIS  
WOULD WORK

- NEED DOWNWIND MONITORS AROUND  
FIRE

SHOULD BE LOCATED WHERE SMOKE IS -

OBJECTIVE - CAPTURE DATA ON RECREATIONAL

EXPOSURE TO ~~FIREFIGHT~~ FIRE ~~FIRE~~ FIGHTING

PROMOTING STRUCTURES OR CUTTING FIRELINES

DOWN WIND - IT'S POSSIBLE SMOKE WILL TRAVEL

UP AND HORIZONTALLY SO THAT SMOKE EXPOSURE  
OCCURS AT AROUND TRAIL RISE

A-1

- HE'S OK w/  
NO FS  
OBSERVER

- ~~REMARKS~~ REMARKS NEED  
TO BE  
RECORDED AS  
THROUGH  
ADAP. 5' FROM

## SCRIPT 2: RESIDENTIAL WOOD HARVESTER

Residents of Libby may harvest firewood within the OU3 study area for personal use as a heating source. Individuals harvesting wood within the OU3 study area may be exposed to LA fibers released from duff and/or soil when disturbed during walking in the woods to the selected trees, from tree bark when cutting down trees and sawing them into manageable size, and from tree bark and/or soil and/or duff when disturbed during hauling the wood to a truck or other vehicle. The following script will be used to simulate residential (non-commercial) wood harvesting activities:

Two individual samplers will perform each residential wood harvesting ABS event. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

For each ABS event at each location, each individual sampler will collect 1 sample to represent exposures that occur while driving to and from the location, and 2 additional samples during the harvesting (felling the tree, cutting it into manageable firewood sizes, stacking into the back of a pickup truck, and cleaning up the area). The scenario is performed in three steps, as follows:

### *1. Driving to the ABS Area (Script 2a, part 1)*

The individual samplers shall initiate the event by entering a pickup truck located in the Flyway, turning on their air monitoring pumps, and riding to the location of trees to be harvested (identified by the US Forest Service) in the truck with the windows open. Once arriving at the tree harvesting location, the truck will be parked along the US Forest Service road, the air monitoring pumps will be turned off and the air sampling cassettes will be capped and set aside until they are re-activated during the drive away from the ABS area.

### *2. Felling, Limbing, Cutting and Stacking (Script 2b)*

The wood harvesting scenario is begun by each individual exiting the pickup truck, attaching new filter cassettes to the low volume and the high volume pumps, and turning the pumps on.

During each ABS event at each designated location, the samplers will harvest one tree identified by the US Forest Service. The samplers shall hike to the tree and one of the samplers will fell the tree and remove branches using a chainsaw. The second individual will haul the cut branches and place them in a pile nearby and perform clean up. The duration of this activity will vary depending on the size of the tree and the distance from the road, but is expected to average approximately 20 minutes. After felling the tree and

removing the branches, if necessary, the samplers shall attach the cut tree to a cable and haul it to the road near the vehicle. Then one sampler will cut the felled tree into pieces of appropriate size for use in wood burning stoves (usually about 16-24 inches in length) and the other sampler will haul the firewood back to the bed of the truck. After 15 minutes, the samplers will reverse roles and continue for another 15 minutes. The total duration for this activity is 50 minutes.

In order to help minimize the chances of generating overloaded filters, the exposures associated with the wood harvesting activities described above may be captured on two sequential cassettes. The optimal break point between the two sequential cassettes will be between felling/limbing and cutting/stacking. In other words, the first wood harvesting sample would include hiking to the tree, felling, limbing, and hauling to the road, and the second wood harvesting sample would include cutting and stacking.

All individuals who perform this activity must be properly trained in the safe use of gasoline powered saws and in safe procedures for felling trees.

After 50 minutes of cutting and hauling wood to the truck, the harvesting scenario is ended. Each individual shall turn off their pumps and remove and cap the cassettes. The area shall be further cleaned up as necessary after sampling has ended.

### *3. Driving from the ABS Area (Script 2a, part 2)*

After removing the cassettes used for wood harvesting, each individual shall re-attach the same cassettes as were used during the truck ride to the area. The pumps will then be re-activated, and the pickup truck shall be driven back to the Flyway (windows open). Once at the Flyway, the driving scenario is ended and the pumps will be turned off and each cassette removed and capped.

At the Flyway, the wood shall be off-loaded from the truck and placed into a pile for potential future use in burning<sup>1</sup>. The wind direction and speed at the sampling location should also be monitored.

## **SCRIPT 3: US FOREST SERVICE WORKER**

U.S. Forest Service workers within the OU3 study area may be exposed to LA fibers during a variety of activities. These include activities routinely performed as part of the Forest Service's land management responsibilities such as maintenance of roads and trails, thinning of trees and vegetation, and surveying trees (stand exam). In addition to routine land management activities, US Forest Service personnel respond to forest fires in the Kootenai National Forest. Fire

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<sup>1</sup> The potential risks associated with burning wood collected from OU3 will be evaluated as part of the OU4 risk assessment, and will not be included in OU3.

fighting activities include those associated with initial ground attack, aerial attack, and sustained ground attack.

For the purposes of the Phase IV ABS investigation, the following scripts will be used to simulate a range of activities that are considered to be representative. ABS sampling will be performed by a team of two samplers except where noted. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

#### Script 3a. Trail Maintenance

Trail maintenance consists mainly of clearing vegetation from the trail. Samplers will travel to the designated ABS locations and park on the roadway. Samplers will exit the vehicle and hike to the designated trail location. Once at the designated trail, samplers will turn on the air sampling pumps. One sampler will use a saw head trimmer to clear trees and brush to a width of about 1-2 feet, and to a height of about 8 feet. The second individual will haul the cut vegetation off the trail. After 15 minutes, the two individuals shall reverse roles. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3b. Tree Thinning

Tree thinning consists of cutting small trees (2-4 inches in diameter) and hauling the wood into a "slash" pile. This activity will be performed for a period of 30 minutes. One individual will cut for 15 minutes, while the second individual hauls wood to a pile. After 15 minutes, the roles are reversed. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3c. Stand Examination

Stand examination consists of obtaining measurements of the girth and height of trees in a stand, and collecting borings from the trees to determine age. Both samplers will perform or simulate all of these activities. Measurement of tree diameter will be performed by passing a measuring tape around the tree at a height of about 1 meter. Measurement of tree height (typically done using a clinometer to measure the angle from a reference point to the top of the tree) will be simulated by walking to a reference point about 10-15 meters from the tree, and looking up to observe the top of the tree (actual measurement of the angle with a clinometers is not required). Collection of a core using an increment borer is described in SOP Tree-Libby-OU3 (see Attachment B). This scenario will be performed by both samplers for a period of 30 minutes. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3d. Cutting a Fireline by Hand

Cutting a fireline by hand consists of establishing a fuel break 18 inches wide by removing as much combustible material as possible. This task requires initial removal of trees and brush using a chainsaw. Then a Pulaski tool or other similar device is used to scrape away all combustible material down to mineral soil to establish a line about approximately 18 inches wide. During an initial attack of a forest fire, these activities are typically done by a crew of 4-6 fire fighters. For the ABS scenario, 2 samplers will participate. This activity will be performed for a period of 30 minutes. The 2 samplers will work approximately 10 feet apart. After 15 minutes, the relative positions of the 2 samplers will be reversed. After 30 minutes, the ABS activity is ended, and both samplers shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3e. Cutting a Fireline with Heavy Equipment

Cutting a fireline with heavy equipment involves using a dozer or tractor plow to remove vegetation and all combustible material down to mineral soil within a line as wide as the dozer or tractor blade. This activity is typically done by a crew consisting of one dozer boss and a crew of several fire fighters. For the ABS scenario, 2 samplers will participate. One sampler will act as the dozer boss and will operate the dozer or tractor plow to cut the fireline. The other sampler will perform activities to simulate a firefighter. The second sampler shall be no closer than 100 feet from the heavy equipment and will pick up and discard excavated combustible material from inside the fireline to outside the fireline. This activity will be performed for a period of 30 minutes. After 30 minutes, both samplers shall turn off their air sampling pumps and cap their sampling cassettes. The dozer/tractor plow operator will then pull back the excavated lines to clean up the area.

### **SCRIPT 4: EXPOSURE OF GROUND-BASED FIREFIGHTERS TO SMOKE**

U.S. Forest Service workers who fight fires on the ground within the OU3 study area may be exposed to LA in air released by burning of contaminated duff and trees. This "smoke" exposure pathway will be evaluated after the results from Scripts 3d and 3e are available and have been evaluated.

The objective of this activity is to characterize LA levels in smoke released from high-intensity fires. This will be achieved by burning two large slash piles that presently exist in OU3. All such simulated wildfire burns in OU3 will be performed in accord with all requirements and recommendations of the U.S. Forest Service. One or more U.S. Forest Service staff will be present at all simulated wildfire events. Each fire will be ignited and allowed to burn for approximately 2 hours. After this time, each fire will be extinguished and then monitored for up to two days to ensure that re-ignition does not occur.

2-3  
2 LPM  
4 LPM

#### Script 4a. Personal ABS Samples

Two samplers will wear personal air monitors during each simulated wildfire. Two pumps will be worn by each sampler. Target flow rate for the first pump is 2 liters per minute (LPM), and the target flow rate for the second pump is 4 LPM. The pumps will not be activated until the fire is generating significant levels of smoke. When smoke generation is significant, the pumps will be activated and each individual wearing the monitors will move about the area of the controlled burn, including time in the cross-wind and down-wind directions. The primary purpose is to capture exposures related to smoke release rather than soil or duff disturbance. After 30 minutes, both samplers shall turn off their air sampling pumps and remove and cap their sampling cassettes. Immediately thereafter, both samplers shall connect new cassettes to both pumps, and collect a second 30-minute set of samples, as above. If conditions allow, a third set of 30-minute samples will be collected following the second round.

Deleted: Four  
Deleted: three  
Deleted: 1  
Deleted: 2  
Deleted: . and the target flow rate for the third pump is 4 LPM

Deleted: the ABS activity is ended, and

#### Script 4b. Stationary Monitors

##### Perimeter Monitors

Four stationary monitors will be installed around the perimeter of each simulated wildfire. These will be positioned approximately 90° apart, with one station being located in the predominant downwind direction at the time the fire is initiated. Each perimeter monitor should be sufficiently distant from the fire that it is not threatened by the heat from the fire. The perimeter monitors will not be activated until the fire is generating significant levels of smoke. Once the pumps are activated, each sample will be collected for a period of 30 minutes. After 30 minutes, the stationary pumps will be turned off and the sampling cassettes capped.

ON GROUND -  
DISTANCE -  
DEPENDS ON TEMP -

##### Downwind Monitors

In addition to the four perimeter monitors, two additional monitors will be placed in the general down-wind direction from the fire. The distance from the fire will be determined by the field crews, based on observations of the smoke. These monitors will be operated at a flow rate of 4 L/min, and the sampling period will be 30 minutes.

4 LPM -  
NTE -  
120° F

##### Near-Libby Monitors

During the time that the fire is burning, each of the three fixed-base contingency monitors described in Attachment D (See Section 4.1 of Attachment D) will also be activated for a time period of 2 hours.

Deleted: In addition, if smoke from either of the simulated wildfires is blowing towards any  
Deleted: . one or more of these monitors should  
Deleted: during the simulated wildfire

Approx. 5 ft -

### Post-Fire Monitoring

Following the fire, stationary air samples will be collected at locations near the fire for 2 additional days to determine if fibers remain in the air or are dispersed by the wind, or if continuing releases are occurring. On each day, two samples will be collected from each of the four perimeter monitors and from each of the two downwind monitors. The locations of the two downwind monitors may be adjusted as needed, based on field observations of smoke emanation from the smoldering slash pile. Sample flow rates will be approximately 4/L min, and sampling time will be approximately 1 hour. One sample set shall be collected during the morning (e.g., at approximately 10:00 AM) and the second set shall be collected during the afternoon (e.g., approximately 3:00 PM).

**Deleted:** from each of the four perimeter air monitors

**Deleted:** Because smoke emission will be much lower than during the fire, sampling time can be increased from 30 minutes to 60 minutes per sample to help decrease the analytical sensitivity

### **SCRIPT 5: EXPOSURE OF PILOTS TO SMOKE**

Currently, within the Fire Suppression Restricted Zone (FSRZ) of the OU3 study area, U.S. Forest Service personnel fight forest fires by air, either in fixed wing aircraft or in helicopters that are used to drop water or fire retardant on burning areas. These individuals may be exposed to LA that has been released into the air by the fire.

In order to characterize the exposure of aircraft pilots during fire suppression flights, a stationary sampling pump will be installed in the cockpit of one or more aircraft deployed for fighting fires within the OU3 study area. The air sampling cassette will be positioned to sample cockpit air, but will be located in a position that does not interfere with the pilot's vision or ability to operate the aircraft.

#### Script 5a. Responding to Simulated Wildfires in OU3

On the day(s) when simulated wildfires are performed in OU3 (see Script 4), one aircraft shall fly over the simulated wildfire area after the smoke plume is well established, simulating a flight path that would be used to attack the fire. Two such simulated aerial attacks shall be performed per simulated wildfire, resulting in 2 filters per wildfire (four total).

For each simulated attack, the air sampling pump will be turned on when the pilot is preparing for takeoff, and will be turned off when the pilot returns to base. For each sample collected, the time of the flight (from takeoff to landing) will be recorded, along with information on the location of the fire and the type of aircraft.

#### Script 5b. Responding to Authentic Wildfires in OU3

When an aerial response to an authentic wildfire in the exclusion zone of OU3 is called for, the USFS will notify Remedium. If the fire is generating significant smoke, Remedium will immediately send a person to the airfield to perform all necessary activities associated with calibrating and activating the pump and collecting the samples (as described above). It is understood that, in some cases, the pilot may be required to begin flights before this can be



achieved. In this event, the pump will be activated during the first available time when the aircraft returns to base between trips to the fire.

#### **SCRIPT 6: EXPOSURE OF AREA RESIDENTS TO SMOKE FROM FOREST FIRES**

EPA (2009b) previously established a plan for collecting stationary air samples at three monitoring locations to evaluate exposures of residents in Libby in the event of a significant forest fire in the Fire Suppression Restricted Zone of OU3. This original "contingency air monitoring plan" has been revised to incorporate the addition of one mobile air monitoring station that will be placed in a downwind location from any authentic wildfire that generates significant smoke in OU3. This revised "contingency air monitoring plan" is provided as Attachment D to this SAP.

In brief, when notified by the USFS of a fire in the exclusion zone of OU3 that is large enough to generate significant smoke, a designated point of contact who is a contractor to Remedium will activate stationary air sampling pumps previously deployed at three locations:

- CDM office building in Libby
- USFS Ranger station along Highway 37
- McGillivray Campground on the west shore of Lake Koocanusa.

Unless smoke levels are so high as to cause filter overloading, sampling duration for these samples will be 24 hours, changing to new filters every 24 hours until the fire is extinguished.

In addition to these three stationary monitors at fixed locations, a fourth monitoring station capable of collecting two independent samples (field duplicates) will be established in an accessible area downwind of the fire. The monitors will be transported to the collection site by truck. The sampling location and distance from the fire will depend on the conditions of the fire. Although details may vary, it is envisioned that the two monitors will be placed on a tripod in the back of the truck, which will be driven to the nearest accessible area that is being impacted by smoke from the fire. Once at the sampling location, the pumps shall be calibrated and the pumps turned on. The target flow rate for these samplers will be 4-6 LPM. Unless safety concerns dictate otherwise, this sampler shall be collected for duration of about 30 minutes. During sample collection, the coordinates of the monitor will be recorded. This information will be used later, in combination with data on the fire location, to establish the distance and direction of the monitor relative to the fire. The wind direction and speed at the sampling location should also be monitored.

**NOTE: In all cases, it is critical that this sampling effort be performed in a way that does not endanger that health or safety of the sampling personnel. If conditions are considered to be potentially unsafe, the sampler should evacuate the area immediately.**



**revisions to ABS**

Bonita Lavelle to: john.d.garr, Robert.R.Marriam

09/30/2010 05:00 PM

Dear John and Bob,

Attached are the revisions to the ABS for fire fighters exposed to smoke that we're currently working on - still in draft form. If you see anything we need to discuss, let me know. The basis for the changes are our conference call and some internal discussions.



Attachment A ABS Scripts Rev 2 sept 30.doc

Sincerely,

Bonnie Lavelle  
Remedial Project Manager  
Libby Asbestos Superfund Site, OU3  
EPA Region 8  
1595 Wynkoop Street  
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Denver, CO 80202-1129

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**LIBBY SUPERFUND SITE OPERABLE UNIT 3  
PHASE IV SAMPLING AND ANALYSIS PLAN**

**ATTACHMENT A  
Revision 2**

**ACTIVITY BASED SAMPLING (ABS) SCRIPTS**

w/ Bill Beatty's  
Edits  
10/1/10

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The team of two samplers will walk from the security gate on Rainy Creek Road to Rainy Creek. Once at Rainy Creek, the two samplers will turn on their sampling pumps. This will be time = 0. Both individuals will then begin to walk up along the banks of the creek, disturbing bushes and other vegetation as needed to move along the bank of the creek. Activities will include the samplers using their hands to push aside ground vegetation to simulate hunting for antlers. To the extent possible, the samplers will cross back and forth across the creek several times so that the ABS activities represent exposures to disturbed sediments and brush on both sides of Rainy Creek.

After 30 minutes moving up the drainage, the two samplers will change positions so that the sampler originally in the lead will be in the following position. The team will then make their way back down the drainage toward the starting point. After 30 more minutes (for a total of 60 minutes), the ABS event ends and the air sampling pumps are turned off and the air sampling cassettes are capped.

## **SCRIPT 2: RESIDENTIAL WOOD HARVESTER**

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The individual samplers shall initiate the event by entering a pickup truck located in the Flyway, turning on their air monitoring pumps, and riding to the location of trees to be harvested (identified by the US Forest Service ) in the truck with the windows open. Once arriving at the tree harvesting location, the truck will be parked along the US Forest Service road, the air monitoring pumps will be turned off and the air sampling cassettes will be capped and set aside until they are re-activated during the drive away from the ABS area.

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removing the branches, if necessary, the samplers shall attach the cut tree to a cable and haul it to the road near the vehicle. Then one sampler will cut the felled tree into pieces of appropriate size for use in wood burning stoves (usually about 16-24 inches in length) and the other sampler will haul the firewood back to the bed of the truck. After 15 minutes, the samplers will reverse roles and continue for another 15 minutes. The total duration for this activity is 50 minutes.

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All individuals who perform this activity must be properly trained in the safe use of gasoline powered saws and in safe procedures for felling trees.

After 50 minutes of cutting and hauling wood to the truck, the harvesting scenario is ended. Each individual shall turn off their pumps and remove and cap the cassettes. The area shall be further cleaned up as necessary after sampling has ended.

### *3. Driving from the ABS Area (Script 2a, part 2)*

After removing the cassettes used for wood harvesting, each individual shall re-attach the same cassettes as were used during the truck ride to the area. The pumps will then be re-activated, and the pickup truck shall be driven back to the Flyway (windows open). Once at the Flyway, the driving scenario is ended and the pumps will be turned off and each cassette removed and capped.

At the Flyway, the wood shall be off-loaded from the truck and placed into a pile for potential future use in burning<sup>1</sup>. The wind direction and speed at the sampling location should also be monitored.

## **SCRIPT 3: US FOREST SERVICE WORKER**

U.S. Forest Service workers within the OU3 study area may be exposed to LA fibers during a variety of activities. These include activities routinely performed as part of the Forest Service's land management responsibilities such as maintenance of roads and trails, thinning of trees and vegetation, and surveying trees (stand exam). In addition to routine land management activities, US Forest Service personnel respond to forest fires in the Kootenai National Forest. Fire

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### Script 3a. Trail Maintenance

Trail maintenance consists mainly of clearing vegetation from the trail. Samplers will travel to the designated ABS locations and park on the roadway. Samplers will exit the vehicle and hike to the designated trail location. Once at the designated trail, samplers will turn on the air sampling pumps. One sampler will use a saw head trimmer to clear trees and brush to a width of about 1-2 feet, and to a height of about 8 feet. The second individual will haul the cut vegetation off the trail. After 15 minutes, the two individuals shall reverse roles. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

### Script 3b. Tree Thinning

Tree thinning consists of cutting small trees (2-4 inches in diameter) and hauling the wood into a "slash" pile. This activity will be performed for a period of 30 minutes. One individual will cut for 15 minutes, while the second individual hauls wood to a pile. After 15 minutes, the roles are reversed. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

### Script 3c. Stand Examination

Stand examination consists of obtaining measurements of the girth and height of trees in a stand, and collecting borings from the trees to determine age. Both samplers will perform or simulate all of these activities. Measurement of tree diameter will be performed by passing a measuring tape around the tree at a height of about 1 meter. Measurement of tree height (typically done using a clinometer to measure the angle from a reference point to the top of the tree) will be simulated by walking to a reference point about 10-15 meters from the tree, and looking up to observe the top of the tree (actual measurement of the angle with a clinometers is not required). Collection of a core using an increment borer is described in SOP Tree-Libby-OU3 (see Attachment B). This scenario will be performed by both samplers for a period of 30 minutes. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

### Script 3d. Cutting a Fireline by Hand

Cutting a fireline by hand consists of establishing a fuel break 18 inches wide by removing as much combustible material as possible. This task requires initial removal of trees and brush using a chainsaw. Then a Pulaski tool or other similar device is used to scrape away all combustible material down to mineral soil to establish a line about approximately 18 inches wide. During an initial attack of a forest fire, these activities are typically done by a crew of 4-6 fire fighters. For the ABS scenario, 2 samplers will participate. This activity will be performed for a period of 30 minutes. The 2 samplers will work approximately 10 feet apart. After 15 minutes, the relative positions of the 2 samplers will be reversed. After 30 minutes, the ABS activity is ended, and both samplers shall turn off their air sampling pumps and cap their sampling cassettes.

### Script 3e. Cutting a Fireline with Heavy Equipment

Cutting a fireline with heavy equipment involves using a dozer or tractor plow to remove vegetation and all combustible material down to mineral soil within a line as wide as the dozer or tractor blade. This activity is typically done by a crew consisting of one dozer boss and a crew of several fire fighters. For the ABS scenario, 2 samplers will participate. One sampler will act as the dozer boss and will operate the dozer or tractor plow to cut the fireline. The other sampler will perform activities to simulate a firefighter. The second sampler shall be no closer than 100 feet from the heavy equipment and will pick up and discard excavated combustible material from inside the fireline to outside the fireline. This activity will be performed for a period of 30 minutes. After 30 minutes, both samplers shall turn off their air sampling pumps and cap their sampling cassettes. The dozer/tractor plow operator will then pull back the excavated lines to clean up the area.

## **SCRIPT 4: EXPOSURE OF GROUND-BASED FIREFIGHTERS TO SMOKE**

U.S. Forest Service workers who fight fires on the ground within the OU3 study area may be exposed to LA in air released by burning of contaminated duff and trees. This "smoke" exposure pathway will be evaluated after the results from Scripts 3d and 3e are available and have been evaluated.

The objective of this activity is to measure LA levels in smoke released from high-intensity fires in order to characterize exposures associated with initial attack fire fighting activities. This will be achieved by burning two large slash piles that presently exist in OU3 on W. R Grace-owned property, and collecting air samples during the burning near the fire and in the predominantly downwind direction. All such simulated wildfire burns in OU3 will be performed in accord with all requirements and recommendations of the U.S. Forest Service for conducting controlled burns. It's expected that each burn will take no more than 2 hours for ignition and collection of

air samples. After the required air samples have been collected, each fire will be extinguished and then monitored as necessary to ensure that re-ignition does not occur.

On the day(s) selected for the burns, one slash pile will be burned in the morning and, if it can be done safely, the second fire will be burned in the afternoon to capture varying meteorological conditions. If the second slash pile can't be performed on the same day due to safety concerns, it will be performed during the afternoon of the following day.

In order to minimize the additive smoke impacts from the first slash pile burn on the second slash pile burn, the slash pile located in the downwind direction will be ignited and monitored first.

$$\begin{aligned} 2 \text{ SAMPLERS} \times 1 \text{ PUMP/EVENT} \times \\ 3 \text{ EVENTS/PILE} \times 2 \text{ PILES} = \\ 12 \text{ SAMPLES} \end{aligned}$$

#### Script 4a. Personal ABS Samples

Two samplers will wear personal air monitors during each simulated wildfire. One pump will be worn by each sampler. Target flow rate for the pump is 4 liters per minute (LPM). The pumps will not be activated until the fire is generating significant levels of smoke. When smoke generation is significant, the pumps will be activated and each individual wearing a monitor will move about the area of the controlled burn, including time in the cross-wind and down-wind directions. The primary purpose is to capture exposures related to smoke release rather than soil or duff disturbance and to characterize exposures representative of initial attack fire fighting activities. After 30 minutes, both samplers shall turn off their air sampling pump and remove and cap their sampling cassette. Immediately thereafter, both samplers shall connect a new cassette to the pump, and collect a second 30-minute sample, as above. If conditions allow, a third 30-minute sample will be collected following the second round.

Samplers will also wear thermometers to monitor temperatures during the sample collection events. Samplers will move no closer to the fire than the distance where the temperature is at or below 120° F.

#### Script 4b. Stationary Monitors

A number of stationary monitors will also be used to collect air sample during and after the burn events. These stationary monitors will be mounted on a tripod to collect samples at a height of approximately 5 feet from the ground.

#### Perimeter Monitors

$$4 \text{ SAMPLES/PILE} \times 2 \text{ PILES} = 8 \text{ SAMPLES}$$

Four stationary monitors will be installed around the perimeter of each simulated wildfire. These will be positioned approximately 90° apart, with one station being located in the predominant downwind direction at the time the fire is initiated. Each perimeter monitor should be sufficiently distant from the fire that the temperature is at or below 120° F.



The perimeter monitors will be activated when the fire is generating significant levels of smoke. Once the pumps are activated, each sample will be collected for a period of 30 minutes. After 30 minutes, the stationary pumps will be turned off and the sampling cassettes capped.

#### *Downwind Monitors*

$$2 \text{ SAMPLES} \times 2 \text{ PILES} = 4 \text{ SAMPLES}$$

In addition to the four perimeter monitors, two additional monitors will be placed in the general down-wind direction from the fire. The distance from the fire will be determined by the field crews, based on observations of the smoke. To the extent possible, the monitors will be positioned to capture smoke coming to the ground. For each downwind monitor, the field crew will record the distance from the slash pile. These monitors will be operated at a flow rate of 4 L/min, and the sampling period will be 30 minutes.

#### *Fixed-Base Monitors*

During the time that the fire is burning, each of the three fixed-base contingency monitors described in Attachment D (See Section 4.1 of Attachment D) will also be activated for a time period of 2 hours..

#### *Post-Fire Monitoring*

Following the fire, stationary air samples will be collected at locations near the fire for 2 additional days to determine if fibers remain in the air or are dispersed by the wind, or if continuing releases are occurring. On each day, two samples will be collected from each of the four perimeter monitors and from each of the two downwind monitors. The locations of the two downwind monitors may be adjusted as needed, based on field observations of smoke emanation from the smoldering slash pile. Sample flow rates will be approximately 4/L min, and sampling time will be approximately 1 hour. One sample set shall be collected during the morning (e.g., at approximately 10:00 AM) and the second set shall be collected during the afternoon (e.g., approximately 3:00 PM)..

### **SCRIPT 5: EXPOSURE OF PILOTS TO SMOKE**

Currently, within the Fire Suppression Restricted Zone (FSRZ) of the OU3 study area, U.S. Forest Service personnel fight forest fires by air, either in fixed wing aircraft or in helicopters that are used to drop water or fire retardant on burning areas. These individuals may be exposed to LA that has been released into the air by the fire.

In order to characterize the exposure of aircraft pilots during fire suppression flights, a stationary sampling pump will be installed in the cockpit of one or more aircraft deployed for fighting fires within the OU3 study area. The air sampling cassette will be positioned to sample cockpit air,

but will be located in a position that does not interfere with the pilot's vision or ability to operate the aircraft.

#### Script 5a. Responding to Simulated Wildfires in OU3

On the day(s) when simulated wildfires are performed in OU3 (see Script 4), one aircraft shall fly over the simulated wildfire area after the smoke plume is well established, simulating a flight path that would be used to attack the fire. Two such simulated aerial attacks shall be performed per simulated wildfire, resulting in 2 filters per wildfire (four total).

For each simulated attack, the air sampling pump will be turned on when the pilot is preparing for takeoff, and will be turned off when the pilot returns to base. For each sample collected, the time of the flight (from takeoff to landing) will be recorded, along with information on the location of the fire and the type of aircraft.

#### Script 5b. Responding to Authentic Wildfires in OU3

When an aerial response to an authentic wildfire in the exclusion zone of OU3 is called for, the USFS will notify Remedium. If the fire is generating significant smoke, Remedium will immediately send a person to the airfield to perform all necessary activities associated with calibrating and activating the pump and collecting the samples (as described above). It is understood that, in some cases, the pilot may be required to begin flights before this can be achieved. In this event, the pump will be activated during the first available time when the aircraft returns to base between trips to the fire.

### **SCRIPT 6: EXPOSURE OF AREA RESIDENTS TO SMOKE FROM FOREST FIRES**

EPA (2009b) previously established a plan for collecting stationary air samples at three monitoring locations to evaluate exposures of residents in Libby in the event of a significant forest fire in the Fire Suppression Restricted Zone of OU3. This original "contingency air monitoring plan" has been revised to incorporate the addition of one mobile air monitoring station that will be placed in a downwind location from any authentic wildfire that generates significant smoke in OU3. This revised "contingency air monitoring plan" is provided as Attachment D to this SAP.

In brief, when notified by the USFS of a fire in the exclusion zone of OU3 that is large enough to generate significant smoke, a designated point of contact who is a contractor to Remedium will activate stationary air sampling pumps previously deployed at three locations:

- CDM office building in Libby
- USFS Ranger station along Highway 37
- McGillivray Campground on the west shore of Lake Koocanusa.

Unless smoke levels are so high as to cause filter overloading, sampling duration for these samples will be 24 hours, changing to new filters every 24 hours until the fire is extinguished.

In addition to these three stationary monitors at fixed locations, a fourth monitoring station capable of collecting two independent samples (field duplicates) will be established in an accessible area downwind of the fire. The monitors will be transported to the collection site by truck. The sampling location and distance from the fire will depend on the conditions of the fire. Although details may vary, it is envisioned that the two monitors will be placed on a tripod in the back of the truck, which will be driven to the nearest accessible area that is being impacted by smoke from the fire. Once at the sampling location, the pumps shall be calibrated and the pumps turned on. The target flow rate for these samplers will be 4-6 LPM. Unless safety concerns dictate otherwise, this sampler shall be collected for duration of about 30 minutes. During sample collection, the coordinates of the monitor will be recorded. This information will be used later, in combination with data on the fire location, to establish the distance and direction of the monitor relative to the fire. The wind direction and speed at the sampling location should also be monitored.

**NOTE: In all cases, it is critical that this sampling effort be performed in a way that does not endanger that health or safety of the sampling personnel. If conditions are considered to be potentially unsafe, the sampler should evacuate the area immediately.**

**LIBBY SUPERFUND SITE OPERABLE UNIT 3  
PHASE IV SAMPLING AND ANALYSIS PLAN**

**ATTACHMENT A**  
*Revision 2*

**ACTIVITY BASED SAMPLING (ABS) SCRIPTS**

This Attachment describes the activities to be performed by individuals performing each of the ABS scenarios described in the Phase IV-A Sampling and Analysis Plan (SAP). Details on the number, location, and timing of ABS sampling events are provided in the Phase IV-A SAP.

**SCRIPT 1: RECREATIONAL VISITORS ALONG LOWER RAINY CREEK**

Recreational visitors along lower Rainy Creek (between Highway 37 and the W.R. Grace property line) may engage in activities such as hiking and antler hunting that could disturb LA in source material (soil, dried stream-side sediment, and duff). The following script will be used to simulate exposures during activities that are considered to be representative of recreational visitors along lower Rainy Creek south of the W.R. Grace property boundary.

For this scenario, Rainy Creek south of the W.R. Grace property boundary will be evaluated as a single ABS study area. ABS sampling will be performed by a team of two individual samplers. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

The team of two samplers will walk from the security gate on Rainy Creek Road to Rainy Creek. Once at Rainy Creek, the two samplers will turn on their sampling pumps. This will be time = 0. Both individuals will then begin to walk up along the banks of the creek, disturbing bushes and other vegetation as needed to move along the bank of the creek. Activities will include the samplers using their hands to push aside ground vegetation to simulate hunting for antlers. To the extent possible, the samplers will cross back and forth across the creek several times so that the ABS activities represent exposures to disturbed sediments and brush on both sides of Rainy Creek.

After 30 minutes moving up the drainage, the two samplers will change positions so that the sampler originally in the lead will be in the following position. The team will then make their way back down the drainage toward the starting point. After 30 more minutes (for a total of 60 minutes), the ABS event ends and the air sampling pumps are turned off and the air sampling cassettes are capped.

## SCRIPT 2: RESIDENTIAL WOOD HARVESTER

Residents of Libby may harvest firewood within the OU3 study area for personal use as a heating source. Individuals harvesting wood within the OU3 study area may be exposed to LA fibers released from duff and/or soil when disturbed during walking in the woods to the selected trees, from tree bark when cutting down trees and sawing them into manageable size, and from tree bark and/or soil and/or duff when disturbed during hauling the wood to a truck or other vehicle. The following script will be used to simulate residential (non-commercial) wood harvesting activities.

Two individual samplers will perform each residential wood harvesting ABS event. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

For each ABS event at each location, each individual sampler will collect 1 sample to represent exposures that occur while driving to and from the location, and 2 additional samples during the harvesting (felling the tree, cutting it into manageable firewood sizes, stacking into the back of a pickup truck, and cleaning up the area). The scenario is performed in three steps, as follows:

### *1. Driving to the ABS Area (Script 2a, part 1)*

The individual samplers shall initiate the event by entering a pickup truck located in the Flyway, turning on their air monitoring pumps, and riding to the location of trees to be harvested (identified by the US Forest Service ) in the truck with the windows open. Once arriving at the tree harvesting location, the truck will be parked along the US Forest Service road, the air monitoring pumps will be turned off and the air sampling cassettes will be capped and set aside until they are re-activated during the drive away from the ABS area.

### *2. Felling, Limbing, Cutting and Stacking (Script 2b)*

The wood harvesting scenario is begun by each individual exiting the pickup truck, attaching new filter cassettes to the low volume and the high volume pumps, and turning the pumps on.

During each ABS event at each designated location, the samplers will harvest one tree identified by the US Forest Service. The samplers shall hike to the tree and one of the samplers will fell the tree and remove branches using a chainsaw. The second individual will haul the cut branches and place them in a pile nearby and perform clean up. The duration of this activity will vary depending on the size of the tree and the distance from the road, but is expected to average approximately 20 minutes. After felling the tree and

removing the branches, if necessary, the samplers shall attach the cut tree to a cable and haul it to the road near the vehicle. Then one sampler will cut the felled tree into pieces of appropriate size for use in wood burning stoves (usually about 16-24 inches in length) and the other sampler will haul the firewood back to the bed of the truck. After 15 minutes, the samplers will reverse roles and continue for another 15 minutes. The total duration for this activity is 50 minutes.

In order to help minimize the chances of generating overloaded filters, the exposures associated with the wood harvesting activities described above may be captured on two sequential cassettes. The optimal break point between the two sequential cassettes will be between felling/limbing and cutting/stacking. In other words, the first wood harvesting sample would include hiking to the tree, felling, limbing, and hauling to the road, and the second wood harvesting sample would include cutting and stacking.

All individuals who perform this activity must be properly trained in the safe use of gasoline powered saws and in safe procedures for felling trees.

After 50 minutes of cutting and hauling wood to the truck, the harvesting scenario is ended. Each individual shall turn off their pumps and remove and cap the cassettes. The area shall be further cleaned up as necessary after sampling has ended.

### *3. Driving from the ABS Area (Script 2a, part 2)*

After removing the cassettes used for wood harvesting, each individual shall re-attach the same cassettes as were used during the truck ride to the area. The pumps will then be re-activated, and the pickup truck shall be driven back to the Flyway (windows open). Once at the Flyway, the driving scenario is ended and the pumps will be turned off and each cassette removed and capped.

At the Flyway, the wood shall be off-loaded from the truck and placed into a pile for potential future use in burning<sup>1</sup>. The wind direction and speed at the sampling location should also be monitored.

## **SCRIPT 3: US FOREST SERVICE WORKER**

U.S. Forest Service workers within the OU3 study area may be exposed to LA fibers during a variety of activities. These include activities routinely performed as part of the Forest Service's land management responsibilities such as maintenance of roads and trails, thinning of trees and vegetation, and surveying trees (stand exam). In addition to routine land management activities, US Forest Service personnel respond to forest fires in the Kootenai National Forest. Fire

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<sup>1</sup> The potential risks associated with burning wood collected from OU3 will be evaluated as part of the OU4 risk assessment, and will not be included in OU3.

fighting activities include those associated with initial ground attack, aerial attack, and sustained ground attack.

For the purposes of the Phase IV ABS investigation, the following scripts will be used to simulate a range of activities that are considered to be representative. ABS sampling will be performed by a team of two samplers except where noted. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

#### Script 3a. Trail Maintenance

Trail maintenance consists mainly of clearing vegetation from the trail. Samplers will travel to the designated ABS locations and park on the roadway. Samplers will exit the vehicle and hike to the designated trail location. Once at the designated trail, samplers will turn on the air sampling pumps. One sampler will use a saw head trimmer to clear trees and brush to a width of about 1-2 feet, and to a height of about 8 feet. The second individual will haul the cut vegetation off the trail. After 15 minutes, the two individuals shall reverse roles. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3b. Tree Thinning

Tree thinning consists of cutting small trees (2-4 inches in diameter) and hauling the wood into a "slash" pile. This activity will be performed for a period of 30 minutes. One individual will cut for 15 minutes, while the second individual hauls wood to a pile. After 15 minutes, the roles are reversed. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3c. Stand Examination

Stand examination consists of obtaining measurements of the girth and height of trees in a stand, and collecting borings from the trees to determine age. Both samplers will perform or simulate all of these activities. Measurement of tree diameter will be performed by passing a measuring tape around the tree at a height of about 1 meter. Measurement of tree height (typically done using a clinometer to measure the angle from a reference point to the top of the tree) will be simulated by walking to a reference point about 10-15 meters from the tree, and looking up to observe the top of the tree (actual measurement of the angle with a clinometers is not required). Collection of a core using an increment borer is described in SOP Tree-Libby-OU3 (see Attachment B). This scenario will be performed by both samplers for a period of 30 minutes. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3d. Cutting a Fireline by Hand

Cutting a fireline by hand consists of establishing a fuel break 18 inches wide by removing as much combustible material as possible. This task requires initial removal of trees and brush using a chainsaw. Then a Pulaski tool or other similar device is used to scrape away all combustible material down to mineral soil to establish a line about approximately 18 inches wide. During an initial attack of a forest fire, these activities are typically done by a crew of 4-6 fire fighters. For the ABS scenario, 2 samplers will participate. This activity will be performed for a period of 30 minutes. The 2 samplers will work approximately 10 feet apart. After 15 minutes, the relative positions of the 2 samplers will be reversed. After 30 minutes, the ABS activity is ended, and both samplers shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3e. Cutting a Fireline with Heavy Equipment

Cutting a fireline with heavy equipment involves using a dozer or tractor plow to remove vegetation and all combustible material down to mineral soil within a line as wide as the dozer or tractor blade. This activity is typically done by a crew consisting of one dozer boss and a crew of several fire fighters. For the ABS scenario, 2 samplers will participate. One sampler will act as the dozer boss and will operate the dozer or tractor plow to cut the fireline. The other sampler will perform activities to simulate a firefighter. The second sampler shall be no closer than 100 feet from the heavy equipment and will pick up and discard excavated combustible material from inside the fireline to outside the fireline. This activity will be performed for a period of 30 minutes. After 30 minutes, both samplers shall turn off their air sampling pumps and cap their sampling cassettes. The dozer/tractor plow operator will then pull back the excavated lines to clean up the area.

### **SCRIPT 4: EXPOSURE OF GROUND-BASED FIREFIGHTERS TO SMOKE**

U.S. Forest Service workers who fight fires on the ground within the OU3 study area may be exposed to LA in air released by burning of contaminated duff and trees. This "smoke" exposure pathway will be evaluated after the results from Scripts 3d and 3e are available and have been evaluated.

The objective of this activity is to measure LA levels in smoke released from high-intensity fires in order to characterize exposures associated with initial attack fire fighting activities. This will be achieved by burning two large slash piles that presently exist in OU3 on W. R Grace-owned property, and collecting air samples during the burning near the fire and in the predominantly downwind direction. All such simulated wildfire burns in OU3 will be performed in accord with all requirements and recommendations of the U.S. Forest Service for conducting controlled burns. It's expected that each burn will take no more than 2 hours for ignition and collection of

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air samples. After the required air samples have been collected, each fire will be extinguished and then monitored as necessary to ensure that re-ignition does not occur.

On the day(s) selected for the burns, one slash pile will be burned in the morning and, if it can be done safely, the second fire will be burned in the afternoon to capture varying meteorological conditions. If the second slash pile can't be performed on the same day due to safety concerns, it will be performed during the afternoon of the following day.

In order to minimize the additive smoke impacts from the first slash pile burn on the second slash pile burn, the slash pile located in the downwind direction will be ignited and monitored first.

#### Script 4a. Personal ABS Samples

Two samplers will wear personal air monitors during each simulated wildfire. One pump will be worn by each sampler. Target flow rate for the pump is 4 liters per minute (LPM). The pumps will not be activated until the fire is generating significant levels of smoke. When smoke generation is significant, the pumps will be activated and each individual wearing a monitor will move about the area of the controlled burn, including time in the cross-wind and down-wind directions. The primary purpose is to capture exposures related to smoke release rather than soil or duff disturbance and to characterize exposures representative of initial attack fire fighting activities. After 30 minutes, both samplers shall turn off their air sampling pump and remove and cap their sampling cassette. Immediately thereafter, both samplers shall connect a new cassette to the pump, and collect a second 30-minute sample, as above. If conditions allow, a third 30-minute sample will be collected following the second round.

Samplers will also wear thermometers to monitor temperatures during the sample collection events. Samplers will move no closer to the fire than the distance where the temperature is at or below 120° F.

#### Script 4b. Stationary Monitors

A number of stationary monitors will also be used to collect air sample during and after the burn events. These stationary monitors will be mounted on a tripod to collect samples at a height of approximately 5 feet from the ground.

#### Perimeter Monitors

Four stationary monitors will be installed around the perimeter of each simulated wildfire. These will be positioned approximately 90° apart, with one station being located in the predominant downwind direction at the time the fire is initiated. Each perimeter monitor should be sufficiently distant from the fire that the temperature is at or below 120° F.

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The perimeter monitors will be activated when the fire is generating significant levels of smoke. Once the pumps are activated, each sample will be collected for a period of 30 minutes. After 30 minutes, the stationary pumps will be turned off and the sampling cassettes capped.

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#### Downwind Monitors

In addition to the four perimeter monitors, two additional monitors will be placed in the general down-wind direction from the fire. The distance from the fire will be determined by the field crews, based on observations of the smoke. To the extent possible, the monitors will be positioned to capture smoke coming to the ground. For each downwind monitor, the field crew will record the distance from the slash pile. These monitors will be operated at a flow rate of 4 L/min, and the sampling period will be 30 minutes.

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#### Fixed-Base Monitors

During the time that the fire is burning, each of the three fixed-base contingency monitors described in Attachment D (See Section 4.1 of Attachment D) will also be activated for a time period of 2 hours.

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#### Post-Fire Monitoring

Following the fire, stationary air samples will be collected at locations near the fire for 2 additional days to determine if fibers remain in the air or are dispersed by the wind, or if continuing releases are occurring. On each day, two samples will be collected from each of the four perimeter monitors and from each of the two downwind monitors. The locations of the two downwind monitors may be adjusted as needed, based on field observations of smoke emanation from the smoldering slash pile. Sample flow rates will be approximately 4/L min, and sampling time will be approximately 1 hour. One sample set shall be collected during the morning (e.g., at approximately 10:00 AM) and the second set shall be collected during the afternoon (e.g., approximately 3:00 PM).

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### **SCRIPT 5: EXPOSURE OF PILOTS TO SMOKE**

Currently, within the Fire Suppression Restricted Zone (FSRZ) of the OU3 study area, U.S. Forest Service personnel fight forest fires by air, either in fixed wing aircraft or in helicopters that are used to drop water or fire retardant on burning areas. These individuals may be exposed to LA that has been released into the air by the fire.

In order to characterize the exposure of aircraft pilots during fire suppression flights, a stationary sampling pump will be installed in the cockpit of one or more aircraft deployed for fighting fires within the OU3 study area. The air sampling cassette will be positioned to sample cockpit air,

but will be located in a position that does not interfere with the pilot's vision or ability to operate the aircraft.

Script 5a. Responding to Simulated Wildfires in OU3

On the day(s) when simulated wildfires are performed in OU3 (see Script 4), one aircraft shall fly over the simulated wildfire area after the smoke plume is well established, simulating a flight path that would be used to attack the fire. Two such simulated aerial attacks shall be performed per simulated wildfire, resulting in 2 filters per wildfire (four total).

For each simulated attack, the air sampling pump will be turned on when the pilot is preparing for takeoff, and will be turned off when the pilot returns to base. For each sample collected, the time of the flight (from takeoff to landing) will be recorded, along with information on the location of the fire and the type of aircraft.

Script 5b. Responding to Authentic Wildfires in OU3

When an aerial response to an authentic wildfire in the exclusion zone of OU3 is called for, the USFS will notify Remedium. If the fire is generating significant smoke, Remedium will immediately send a person to the airfield to perform all necessary activities associated with calibrating and activating the pump and collecting the samples (as described above). It is understood that, in some cases, the pilot may be required to begin flights before this can be achieved. In this event, the pump will be activated during the first available time when the aircraft returns to base between trips to the fire.

**SCRIPT 6: EXPOSURE OF AREA RESIDENTS TO SMOKE FROM FOREST FIRES**

EPA (2009b) previously established a plan for collecting stationary air samples at three monitoring locations to evaluate exposures of residents in Libby in the event of a significant forest fire in the Fire Suppression Restricted Zone of OU3. This original "contingency air monitoring plan" has been revised to incorporate the addition of one mobile air monitoring station that will be placed in a downwind location from any authentic wildfire that generates significant smoke in OU3. This revised "contingency air monitoring plan" is provided as Attachment D to this SAP.

In brief, when notified by the USFS of a fire in the exclusion zone of OU3 that is large enough to generate significant smoke, a designated point of contact who is a contractor to Remedium will activate stationary air sampling pumps previously deployed at three locations:

- CDM office building in Libby
- USFS Ranger station along Highway 37
- McGillivray Campground on the west shore of Lake Koochanusa.

Unless smoke levels are so high as to cause filter overloading, sampling duration for these samples will be 24 hours, changing to new filters every 24 hours until the fire is extinguished.

In addition to these three stationary monitors at fixed locations, a fourth monitoring station capable of collecting two independent samples (field duplicates) will be established in an accessible area downwind of the fire. The monitors will be transported to the collection site by truck. The sampling location and distance from the fire will depend on the conditions of the fire. Although details may vary, it is envisioned that the two monitors will be placed on a tripod in the back of the truck, which will be driven to the nearest accessible area that is being impacted by smoke from the fire. Once at the sampling location, the pumps shall be calibrated and the pumps turned on. The target flow rate for these samplers will be 4-6 LPM. Unless safety concerns dictate otherwise, this sampler shall be collected for duration of about 30 minutes. During sample collection, the coordinates of the monitor will be recorded. This information will be used later, in combination with data on the fire location, to establish the distance and direction of the monitor relative to the fire. The wind direction and speed at the sampling location should also be monitored.

**NOTE: In all cases, it is critical that this sampling effort be performed in a way that does not endanger that health or safety of the sampling personnel. If conditions are considered to be potentially unsafe, the sampler should evacuate the area immediately.**



RE: revised ABS script  
Bonita Lavelle to: Brattin, Bill

10/01/2010 04:28 PM

STILL NEED —  
• COMMENTS FROM REVISIONS  
• FIELD TEO FORM

thanks Bill

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So, here's yet another version with some minor changes on the post-fire monitoring - based on a conversation I had w/ John Garr.

See what you think...



Attachment A ABS Scripts Rev 2 v3.doc

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- an SOP for the stationary monitors
- FSDs forms for the stationary monitors

If we need to, I'd like to include these in the mod.

thank you!  
(aren't you going to miss this?)

"Brattin, Bill"

Ah...here is the attachment. Sorry \*\*\*\*\*...

10/01/2010 12:09:03 PM

From: "Brattin, Bill" <brattin@srcinc.com>  
To: Bonita Lavelle/R8/USEPA/US@EPA  
Date: 10/01/2010 12:09 PM  
Subject: RE: revised ABS script

Ah...here is the attachment. Sorry

\*\*\*\*\*

Bill Brattin  
SRC, Inc.  
999 18th Street Suite 1975  
Denver CO 80202  
Phone: 303-357-3121  
Fax: 303-292-4755  
e-mail: brattin@srcinc.com

-----Original Message-----

From: Lavelle.Bonita@epamail.epa.gov [mailto:Lavelle.Bonita@epamail.epa.gov]  
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[attachment "Attachment A ABS Scripts Rev 2 v2.doc" deleted by Bonita Lavelle/R8/USEPA/US]

**LIBBY SUPERFUND SITE OPERABLE UNIT 3  
PHASE IV SAMPLING AND ANALYSIS PLAN**

**ATTACHMENT A**  
*Revision 2*

**ACTIVITY BASED SAMPLING (ABS) SCRIPTS**

This Attachment describes the activities to be performed by individuals performing each of the ABS scenarios described in the Phase IV-A Sampling and Analysis Plan (SAP). Details on the number, location, and timing of ABS sampling events are provided in the Phase IV-A SAP.

**SCRIPT 1: RECREATIONAL VISITORS ALONG LOWER RAINY CREEK**

Recreational visitors along lower Rainy Creek (between Highway 37 and the W.R. Grace property line) may engage in activities such as hiking and antler hunting that could disturb LA in source material (soil, dried stream-side sediment, and duff). The following script will be used to simulate exposures during activities that are considered to be representative of recreational visitors along lower Rainy Creek south of the W.R. Grace property boundary.

For this scenario, Rainy Creek south of the W.R. Grace property boundary will be evaluated as a single ABS study area. ABS sampling will be performed by a team of two individual samplers. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

The team of two samplers will walk from the security gate on Rainy Creek Road to Rainy Creek. Once at Rainy Creek, the two samplers will turn on their sampling pumps. This will be time = 0. Both individuals will then begin to walk up along the banks of the creek, disturbing bushes and other vegetation as needed to move along the bank of the creek. Activities will include the samplers using their hands to push aside ground vegetation to simulate hunting for antlers. To the extent possible, the samplers will cross back and forth across the creek several times so that the ABS activities represent exposures to disturbed sediments and brush on both sides of Rainy Creek.

After 30 minutes moving up the drainage, the two samplers will change positions so that the sampler originally in the lead will be in the following position. The team will then make their way back down the drainage toward the starting point. After 30 more minutes (for a total of 60 minutes), the ABS event ends and the air sampling pumps are turned off and the air sampling cassettes are capped.

## SCRIPT 2: RESIDENTIAL WOOD HARVESTER

Residents of Libby may harvest firewood within the OU3 study area for personal use as a heating source. Individuals harvesting wood within the OU3 study area may be exposed to LA fibers released from duff and/or soil when disturbed during walking in the woods to the selected trees, from tree bark when cutting down trees and sawing them into manageable size, and from tree bark and/or soil and/or duff when disturbed during hauling the wood to a truck or other vehicle. The following script will be used to simulate residential (non-commercial) wood harvesting activities.

Two individual samplers will perform each residential wood harvesting ABS event. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

For each ABS event at each location, each individual sampler will collect 1 sample to represent exposures that occur while driving to and from the location, and 2 additional samples during the harvesting (felling the tree, cutting it into manageable firewood sizes, stacking into the back of a pickup truck, and cleaning up the area). The scenario is performed in three steps, as follows:

### *1. Driving to the ABS Area (Script 2a, part 1)*

The individual samplers shall initiate the event by entering a pickup truck located in the Flyway, turning on their air monitoring pumps, and riding to the location of trees to be harvested (identified by the US Forest Service ) in the truck with the windows open. Once arriving at the tree harvesting location, the truck will be parked along the US Forest Service road, the air monitoring pumps will be turned off and the air sampling cassettes will be capped and set aside until they are re-activated during the drive away from the ABS area.

### *2. Felling, Limbing, Cutting and Stacking (Script 2b)*

The wood harvesting scenario is begun by each individual exiting the pickup truck, attaching new filter cassettes to the low volume and the high volume pumps, and turning the pumps on.

During each ABS event at each designated location, the samplers will harvest one tree identified by the US Forest Service. The samplers shall hike to the tree and one of the samplers will fell the tree and remove branches using a chainsaw. The second individual will haul the cut branches and place them in a pile nearby and perform clean up. The duration of this activity will vary depending on the size of the tree and the distance from the road, but is expected to average approximately 20 minutes. After felling the tree and



removing the branches, if necessary, the samplers shall attach the cut tree to a cable and haul it to the road near the vehicle. Then one sampler will cut the felled tree into pieces of appropriate size for use in wood burning stoves (usually about 16-24 inches in length) and the other sampler will haul the firewood back to the bed of the truck. After 15 minutes, the samplers will reverse roles and continue for another 15 minutes. The total duration for this activity is 50 minutes.

In order to help minimize the chances of generating overloaded filters, the exposures associated with the wood harvesting activities described above may be captured on two sequential cassettes. The optimal break point between the two sequential cassettes will be between felling/limbing and cutting/stacking. In other words, the first wood harvesting sample would include hiking to the tree, felling, limbing, and hauling to the road, and the second wood harvesting sample would include cutting and stacking.

All individuals who perform this activity must be properly trained in the safe use of gasoline powered saws and in safe procedures for felling trees.

After 50 minutes of cutting and hauling wood to the truck, the harvesting scenario is ended. Each individual shall turn off their pumps and remove and cap the cassettes. The area shall be further cleaned up as necessary after sampling has ended.

### *3. Driving from the ABS Area (Script 2a, part 2)*

After removing the cassettes used for wood harvesting, each individual shall re-attach the same cassettes as were used during the truck ride to the area. The pumps will then be re-activated, and the pickup truck shall be driven back to the Flyway (windows open). Once at the Flyway, the driving scenario is ended and the pumps will be turned off and each cassette removed and capped.

At the Flyway, the wood shall be off-loaded from the truck and placed into a pile for potential future use in burning<sup>1</sup>. The wind direction and speed at the sampling location should also be monitored.

## **SCRIPT 3: US FOREST SERVICE WORKER**

U.S. Forest Service workers within the OU3 study area may be exposed to LA fibers during a variety of activities. These include activities routinely performed as part of the Forest Service's land management responsibilities such as maintenance of roads and trails, thinning of trees and vegetation, and surveying trees (stand exam). In addition to routine land management activities, US Forest Service personnel respond to forest fires in the Kootenai National Forest. Fire

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<sup>1</sup> The potential risks associated with burning wood collected from OU3 will be evaluated as part of the OU4 risk assessment, and will not be included in OU3.

fighting activities include those associated with initial ground attack, aerial attack, and sustained ground attack.

For the purposes of the Phase IV ABS investigation, the following scripts will be used to simulate a range of activities that are considered to be representative. ABS sampling will be performed by a team of two samplers except where noted. Three pumps will be worn by each sampler. Target flow rate for the first pump is 1 liters per minute (LPM), the target flow rate for the second pump is 2 LPM, and the target flow rate for the third pump is 4 LPM.

#### Script 3a. Trail Maintenance

Trail maintenance consists mainly of clearing vegetation from the trail. Samplers will travel to the designated ABS locations and park on the roadway. Samplers will exit the vehicle and hike to the designated trail location. Once at the designated trail, samplers will turn on the air sampling pumps. One sampler will use a saw head trimmer to clear trees and brush to a width of about 1-2 feet, and to a height of about 8 feet. The second individual will haul the cut vegetation off the trail. After 15 minutes, the two individuals shall reverse roles. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3b. Tree Thinning

Tree thinning consists of cutting small trees (2-4 inches in diameter) and hauling the wood into a "slash" pile. This activity will be performed for a period of 30 minutes. One individual will cut for 15 minutes, while the second individual hauls wood to a pile. After 15 minutes, the roles are reversed. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3c. Stand Examination

Stand examination consists of obtaining measurements of the girth and height of trees in a stand, and collecting borings from the trees to determine age. Both samplers will perform or simulate all of these activities. Measurement of tree diameter will be performed by passing a measuring tape around the tree at a height of about 1 meter. Measurement of tree height (typically done using a clinometer to measure the angle from a reference point to the top of the tree) will be simulated by walking to a reference point about 10-15 meters from the tree, and looking up to observe the top of the tree (actual measurement of the angle with a clinometers is not required). Collection of a core using an increment borer is described in SOP Tree-Libby-OU3 (see Attachment B). This scenario will be performed by both samplers for a period of 30 minutes. After 30 minutes, the ABS activity is ended, and both individuals shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3d. Cutting a Fireline by Hand

Cutting a fireline by hand consists of establishing a fuel break 18 inches wide by removing as much combustible material as possible. This task requires initial removal of trees and brush using a chainsaw. Then a Pulaski tool or other similar device is used to scrape away all combustible material down to mineral soil to establish a line about approximately 18 inches wide. During an initial attack of a forest fire, these activities are typically done by a crew of 4-6 fire fighters. For the ABS scenario, 2 samplers will participate. This activity will be performed for a period of 30 minutes. The 2 samplers will work approximately 10 feet apart. After 15 minutes, the relative positions of the 2 samplers will be reversed. After 30 minutes, the ABS activity is ended, and both samplers shall turn off their air sampling pumps and cap their sampling cassettes.

#### Script 3e. Cutting a Fireline with Heavy Equipment

Cutting a fireline with heavy equipment involves using a dozer or tractor plow to remove vegetation and all combustible material down to mineral soil within a line as wide as the dozer or tractor blade. This activity is typically done by a crew consisting of one dozer boss and a crew of several fire fighters. For the ABS scenario, 2 samplers will participate. One sampler will act as the dozer boss and will operate the dozer or tractor plow to cut the fireline. The other sampler will perform activities to simulate a firefighter. The second sampler shall be no closer than 100 feet from the heavy equipment and will pick up and discard excavated combustible material from inside the fireline to outside the fireline. This activity will be performed for a period of 30 minutes. After 30 minutes, both samplers shall turn off their air sampling pumps and cap their sampling cassettes. The dozer/tractor plow operator will then pull back the excavated lines to clean up the area.

### **SCRIPT 4: EXPOSURE OF GROUND-BASED FIREFIGHTERS TO SMOKE**

U.S. Forest Service workers who fight fires on the ground within the OU3 study area may be exposed to LA in air released by burning of contaminated duff and trees. This "smoke" exposure pathway will be evaluated after the results from Scripts 3d and 3e are available and have been evaluated.

The objective of this activity is to measure LA levels in smoke released from high-intensity fires in order to characterize exposures associated with initial attack fire fighting activities. This will be achieved by burning two large slash piles that presently exist in OU3 on W. R Grace-owned property, and collecting air samples during the burning near the fire and in the predominantly downwind direction. All such simulated wildfire burns in OU3 will be performed in accord with all requirements and recommendations of the U.S. Forest Service for conducting controlled burns. It's expected that each burn will take no more than 2 hours for ignition and collection of

air samples. After the required air samples have been collected, each fire will be extinguished and then monitored as necessary to ensure that re-ignition does not occur.

On the day(s) selected for the burns, one slash pile will be burned in the morning and, if it can be done safely, the second fire will be burned in the afternoon to capture varying meteorological conditions. If the second slash pile can't be performed on the same day due to safety concerns, it will be performed during the afternoon of the following day.

In order to minimize the additive smoke impacts from the first slash pile burn on the second slash pile burn, the slash pile located in the downwind direction will be ignited and monitored first.

#### Script 4a. Personal ABS Samples

Two samplers will wear personal air monitors during each simulated wildfire. One pump will be worn by each sampler. Target flow rate for the pump is 4 liters per minute (LPM). The pumps will not be activated until the fire is generating significant levels of smoke. When smoke generation is significant, the pumps will be activated and each individual wearing a monitor will move about the area of the controlled burn, including time in the cross-wind and down-wind directions. The primary purpose is to capture exposures related to smoke release rather than soil or duff disturbance and to characterize exposures representative of initial attack fire fighting activities. After 30 minutes, both samplers shall turn off their air sampling pump and remove and cap their sampling cassette. Immediately thereafter, both samplers shall connect a new cassette to the pump, and collect a second 30-minute sample, as above. If conditions allow, a third 30-minute sample will be collected following the second round.

Samplers will also wear thermometers to monitor temperatures during the sample collection events. Samplers will move no closer to the fire than the distance where the temperature is at or below 120° F.

#### Script 4b. Stationary Monitors

A number of stationary monitors will also be used to collect air samples during and after the burn events. These stationary monitors will be mounted on a tripod to collect samples at a height of approximately 5 feet from the ground.

#### *Perimeter Monitors*

Four stationary monitors will be installed around the perimeter of each simulated wildfire. These will be positioned approximately 90° apart, with one station being located in the predominant downwind direction at the time the fire is initiated. Each perimeter monitor should be sufficiently distant from the fire that the temperature is at or below 120° F.

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The perimeter monitors will be activated when the fire is generating significant levels of smoke. Once the pumps are activated, each sample will be collected for a period of 30 minutes. After 30 minutes, the stationary pumps will be turned off and the sampling cassettes capped.

#### *Downwind Monitors*

In addition to the four perimeter monitors, two additional monitors will be placed in the general down-wind direction from the fire. The distance from the fire will be determined by the field crews, based on observations of the smoke. To the extent possible, the monitors will be positioned to capture smoke coming to the ground. For each downwind monitor, the field crew will record the distance from the slash pile. These monitors will be operated at a flow rate of 4 L/min, and the sampling period will be 30 minutes.

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#### *Fixed-Base Monitors*

During the time that the fire is burning, each of the three fixed-base contingency monitors described in Attachment D (See Section 4.1 of Attachment D) will also be activated for a time period of 2 hours.

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#### *Post-Fire Monitoring*

Following the fire, stationary air samples will be collected at locations near the fire for 2 additional days to determine if fibers remain in the air or are dispersed by the wind, or if continuing releases are occurring. Four stationary monitors will be installed around the perimeter of the area encompassing the 2 slash piles. These monitors will be positioned approximately 90° apart, with one station being located in the predominant downwind direction. On each day, two samples will be collected from each of the four perimeter monitors and from each of two downwind monitors. The locations of the two downwind monitors may be adjusted as needed, based on field observations of smoke emanation from the smoldering slash pile, or if there is no smoke, based on access to suitable monitoring areas. The downwind monitors should be placed at distances approximately 1/8 mile and 1/4 mile from the area of the slash piles. Sample flow rates for all post-fire stationary air monitors will be approximately 4/L min, and sampling time will be approximately 1 hour. One sample set shall be collected during the morning (e.g., at approximately 10:00 AM) and the second set shall be collected during the afternoon (e.g., approximately 3:00 PM).

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#### **SCRIPT 5: EXPOSURE OF PILOTS TO SMOKE**

Currently, within the Fire Suppression Restricted Zone (FSRZ) of the OU3 study area, U.S. Forest Service personnel fight forest fires by air, either in fixed wing aircraft or in helicopters that are used to drop water or fire retardant on burning areas. These individuals may be exposed to LA that has been released into the air by the fire.

In order to characterize the exposure of aircraft pilots during fire suppression flights, a stationary sampling pump will be installed in the cockpit of one or more aircraft deployed for fighting fires within the OU3 study area. The air sampling cassette will be positioned to sample cockpit air, but will be located in a position that does not interfere with the pilot's vision or ability to operate the aircraft.

#### Script 5a. Responding to Simulated Wildfires in OU3

On the day(s) when simulated wildfires are performed in OU3 (see Script 4), one aircraft shall fly over the simulated wildfire area after the smoke plume is well established, simulating a flight path that would be used to attack the fire. Two such simulated aerial attacks shall be performed per simulated wildfire, resulting in 2 filters per wildfire (four total).

For each simulated attack, the air sampling pump will be turned on when the pilot is preparing for takeoff, and will be turned off when the pilot returns to base. For each sample collected, the time of the flight (from takeoff to landing) will be recorded, along with information on the location of the fire and the type of aircraft.

#### Script 5b. Responding to Authentic Wildfires in OU3

When an aerial response to an authentic wildfire in the exclusion zone of OU3 is called for, the USFS will notify Remedium. If the fire is generating significant smoke, Remedium will immediately send a person to the airfield to perform all necessary activities associated with calibrating and activating the pump and collecting the samples (as described above). It is understood that, in some cases, the pilot may be required to begin flights before this can be achieved. In this event, the pump will be activated during the first available time when the aircraft returns to base between trips to the fire.

### **SCRIPT 6: EXPOSURE OF AREA RESIDENTS TO SMOKE FROM FOREST FIRES**

EPA (2009b) previously established a plan for collecting stationary air samples at three monitoring locations to evaluate exposures of residents in Libby in the event of a significant forest fire in the Fire Suppression Restricted Zone of OU3. This original "contingency air monitoring plan" has been revised to incorporate the addition of one mobile air monitoring station that will be placed in a downwind location from any authentic wildfire that generates significant smoke in OU3. This revised "contingency air monitoring plan" is provided as Attachment D to this SAP.

In brief, when notified by the USFS of a fire in the exclusion zone of OU3 that is large enough to generate significant smoke, a designated point of contact who is a contractor to Remedium will activate stationary air sampling pumps previously deployed at three locations:

- CDM office building in Libby

- USFS Ranger station along Highway 37
- McGillivray Campground on the west shore of Lake Koocanusa.

Unless smoke levels are so high as to cause filter overloading, sampling duration for these samples will be 24 hours, changing to new filters every 24 hours until the fire is extinguished.

In addition to these three stationary monitors at fixed locations, a fourth monitoring station capable of collecting two independent samples (field duplicates) will be established in an accessible area downwind of the fire. The monitors will be transported to the collection site by truck. The sampling location and distance from the fire will depend on the conditions of the fire. Although details may vary, it is envisioned that the two monitors will be placed on a tripod in the back of the truck, which will be driven to the nearest accessible area that is being impacted by smoke from the fire. Once at the sampling location, the pumps shall be calibrated and the pumps turned on. The target flow rate for these samplers will be 4-6 LPM. Unless safety concerns dictate otherwise, this sampler shall be collected for duration of about 30 minutes. During sample collection, the coordinates of the monitor will be recorded. This information will be used later, in combination with data on the fire location, to establish the distance and direction of the monitor relative to the fire. The wind direction and speed at the sampling location should also be monitored.

**NOTE: In all cases, it is critical that this sampling effort be performed in a way that does not endanger that health or safety of the sampling personnel. If conditions are considered to be potentially unsafe, the sampler should evacuate the area immediately.**

RE: revised ABS script

Woodbury, Lynn to: Bonita Lavelle

Cc: "Brattin, Bill"

10/04/2010 10:37 AM

2 attachments

Attach 2\_STAT AIR FSDS\_OU3\_Rev0.pdf Attach 1\_SOP EPA-LIBBY-01\_Rev1.pdf

Bonnie -

I think the existing stationary air SOP and FSDS form cited in the Contingency Monitoring Plan should be sufficient for the slash pile burns.

This SOP and FSDS are posted out on the OU3 webpage under the Phase IV-A SAP, under Attachment D. I've also attached them to this email.

Please let me know if you need anything else,

Lynn

-----Original Message-----

From: Brattin, Bill

Sent: Friday, October 01, 2010 4:53 PM

To: Lavelle.Bonita@epamail.epa.gov

Cc: Woodbury, Lynn

Subject: RE: revised ABS script

The edits seem fine to me.

We will check on the SOP for stationary monitors and see about an FSDS for them on Monday AM

Lynn...come see me on this.

\*\*\*\*\*

Bill Brattin

SRC, Inc.

999 18th Street, Suite 1975

Denver CO 80202

brattin@srcinc.com

303-357-3121

---

From: Lavelle.Bonita@epamail.epa.gov [Lavelle.Bonita@epamail.epa.gov]

Sent: Friday, October 01, 2010 6:28 PM

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(See attached file: Attachment A ABS Scripts Rev 2 v3.doc)

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- FSDs forms for the stationary monitors

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(aren't you going to miss this?)

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Date: 10/01/2010 12:09 PM  
Subject: RE: revised ABS script

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SRC, Inc.  
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I suggest just accepting all the changes, and then re-issuing the clean  
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[attachment "Attachment A ABS Scripts Rev 2 v2.doc" deleted by Bonita  
Lavelle/R8/USEPA/US]



U.S. ENVIRONMENTAL PROTECTION AGENCY  
REGION 8

STANDARD OPERATING PROCEDURE (SOP)  
FOR THE SAMPLING OF ASBESTOS FIBERS IN AIR

Prepared by: William D. Smith for W. Brattin  
(Author)

Date: 3/8/01

Reviewed by: Chloris  
(Project Director)

Date: 3/8/01

W. J. Goldacke  
(Quality Assurance Coordinator)

Date: 3/8/01

Approved by: Chloris for Paul Peronard  
(Project Manager)

Date: 3/9/01

SOP EPA-LIBBY-01

Revision # 1

Date: March 2001

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REVISION LOG

Revision Date	Reason for Revision
02/28/01	--
03/07/01	Further define pump calibration procedures.

## PROCEDURAL SECTION

### 1.0 Scope and Applicability

This Standard Operating Procedure (SOP) provides a standardized method for sampling air to measure the concentration of asbestos fibers. This SOP is applicable to any type of asbestos fiber (amphibole, chrysotile) that may exist in air (either indoor or outdoor), and is applicable to both personal and ambient air (referred as stationary air throughout this SOP) sampling techniques. Filters collected in this way are suitable for examination by a variety of microscopic techniques, including TEM, PCM, and SEM.

### 2.0 Summary of Method

This SOP is based on air sampling techniques described in EPA SOP 2015, ISO 10312, OSHA Technical Manual, NIOSH 7400 and NIOSH 7402.

Air is drawn through a fine-pore filter in order to trap any suspended particulate matter in the air, including suspended asbestos fibers and other mineralogic materials. The filters are then examined using an appropriate microscopic technique to observe, characterize and quantify the number of asbestos fibers on the filter. The concentration of fibers in air is then calculated by dividing the total number of fibers on the filter by the volume of air drawn through the filter.

### 3.0 Health and Safety Warnings

Asbestos fibers are hazardous to human health when inhaled. Exposure to excessive levels may increase the risk of lung cancer, mesothelioma, and asbestosis. All personnel engaged in collection of air samples in areas where asbestos fibers may be present must have adequate health and safety training and must wear an appropriate level of personal protective equipment (PPE). Refer to the Health and Safety Plan for further details.

### 4.0 Cautions

None, refer to Section 3.0.

### 5.0 Interferences

High levels of dust or other suspended particulates may clog or overload the filter and reduce the ability to observe and characterize asbestos fibers on the filters. Precautions should be taken to avoid any unnecessary sources of dust emissions or use of aerosol sprays. Sampling conditions

(flow rate, sampling time) should be adjusted accordingly to avoid filter overload.

## 6.0 Personnel Qualifications

Field personnel engaged in collection of filter cassettes must be trained in the proper use and calibration of the air sampling equipment (as specified in this SOP), as well as proper methods for data recording and sample handling. Additionally, all field personnel must maintain appropriate and current training and/or certifications to meet all federal, state, and local regulations.

## 7.0 Apparatus and Equipment

### Filter Cassettes

All samples will be collected on conductive filter holders consisting of 25-mm diameter, three piece filter cassettes having a 50-mm long electrically conductive extension cowl. The cassette shall be pre-loaded with a mixed cellulose ester (MCE) filter with pore size 0.8  $\mu\text{m}$ . Use of the 0.8  $\mu\text{m}$  pore size is recommended for all samples so that samples collected using a high volume pump are comparable to samples collected with a low volume pump. The 0.8  $\mu\text{m}$  pore size filters are used for samples collected with a low volume pump in order to decrease back-pressure and increase flow rate.

To reduce contamination and to hold the cassette tightly together, seal the crease between the cassette base and the cowl with a shrink band or adhesive tape. If particle deposition on the inside of the cowl is observed, it may be necessary to ground the cowl to reduce static charge. This is done by attaching one end of a length of flexible wire to the plastic cowl with a hose clamp and attaching the other end of the wire to a suitable ground (e.g., a cold water pipe).

### Air Pumps

The sampling pump used shall provide a non-fluctuating airflow through the filter and shall maintain the initial flow rate within  $\pm 10\%$  throughout the sampling period.

A variety of different types of air pump may be used, depending on the flow rates that are required to achieve the data quality objectives and desired analytical sensitivity of the project. In general, the pump should be selected to deliver a flow rate that is as high as possible without overloading the filter with dust or fibers. The minimum flow rate is 0.5 L/min, and rates up to 10 L/min may be appropriate in some cases.

For stationary air monitors, a high volume pump that operates on AC power is recommended. For personal air sampling, either a portable high volume AC powered sampler or a low volume

battery-operated pump are acceptable, depending on whether the activities of the individual are impaired by the tethering imposed by the power cord needed for the high volume pump.

### Tripod

For stationary air monitors, a tripod or other similar device is required to hold the filter cassette at a specified elevation above the floor. As noted below, this will typically be a height that represents the breathing zone (1.5-2 meters).

### Spring Clips

For personal air monitors, the filter cassette is held in place using spring clips or other similar devices.

### Rotameter

A rotameter that has been calibrated to a primary calibration source is required to calibrate the air flow rate at the start and the end of each sampling period. Due to its dependency on changes in atmospheric pressure, the rotameter must be calibrated to a primary calibration source at the site location (e.g., City of Libby) prior to sampling and re-calibrated on-site every week. Record calibration and re-calibration to the primary standard in the field logbook.

### Primary Calibration Source

A bubble buret or other primary calibration standard may be used to calibrate the rotameter.

### Sample Labels

A pre-printed sheet of sample labels (2 identical labels per sample number) is required. One label should be attached to the filter cassette before the sample collection period begins, and the matching label should be attached to the field data sheet that records relevant data on the sample being collected.

### Field Log Book

A field log book is required to record relevant information regarding the collection of samples (location, time, unusual conditions or problems, etc.).

### Field Data Sheet

A personal air or stationary air monitoring field data sheet (as appropriate) is required to record the relevant sampling information. Refer to the Phase 2 QAPP (EPA, March 2001) for the form.

## 8.0 Instrument Calibration

External calibration devices such as a bubble buret or a rotometer that have been calibrated to a primary calibration source may be used to calibrate air flow rate prior to air sampling. The flow rate must also be measured by the same method at the end of the sampling period.

### 8.1 Calibrating a Rotameter with an Electronic Calibrator (DryCal)

- See manufacturer's manual for operational instructions.
- To set up the calibration train, attach one end of the tygon tubing to the outlet plug of the rotameter; attach the other end of the tubing to the inlet plug on the pump. Another piece of tubing is attached from the inlet plug of the rotameter to the outlet plug on the DryCal.
- Rest or firmly stabilize the rotameter so that it is vertical ( $\pm 6^\circ$ ).
- Attach an isolating load with a pressure drop of about 10 to 20 inches of water column in series with a stable pump (a filter cassette of same lot number as will be used for field samples works well for this).
- Turn the DryCal and sampling pump on.
- Turn the flow adjust screw (or knob) on the pump until the desired flow rate is attained.
- Record the DryCal flow rate reading and the corresponding rotameter reading in the field logbook. The rotameter should be able to work within the desired flow range.
- Perform the calibration three times until the desired flow rate of  $\pm 5\%$  is attained. Once at the sampling location, a secondary calibrator (e.g., rotameter) may be used to calibrate sampling pumps.

### 8.2 Calibrating an Air Pump with a Rotameter

A rotameter can be used provided it has been precalibrated to a primary calibration source at the site location (e.g., City of Libby). Three separate constant flow calibration readings should be obtained both before sampling and after sampling. The mean value of these flow rate measurements shall be used to calculate the total air volume sampled.

Turn on the sampling pump and run for 5 minutes before performing calibration.

- Remove the end plugs on the filter cassette. A cassette, representative of the lot planned for use in air sampling, must be used.
- To set up the calibration train, attach one end of the tygon tubing to the cassette base; attach the other end of the tubing to the inlet plug on the pump. Another piece of tubing is attached from the cassette cap to the rotameter.



- Rest or firmly stabilize the flow meter so that it is vertical ( $\pm 6^\circ$ ).
- Turn the flow adjust screw (or knob) on the sampling pump until the center of the float ball on the rotameter meets the flow rate value specified in the project plan.

## 9.0 Sample Collection

Apply one of the pre-printed adhesive labels to the filter cassette and apply the other to the field data sheet for the sample.

Secure the filter cassette in the appropriate sampling location. For a fixed air monitor, this will generally be at a height that represents the breathing zone of the potentially exposed population (e.g., 1.5- 2 meters above the floor). For personal air monitoring, the cassette will typically be placed on the lapel just below the face of the individual being monitored. For personal air sampling for Scenarios 2 and 3 [Refer to Phase 2 QAPP (EPA March 2001)] , secure the cassette on the lapel of the dominant hand of the worker. The distance from the nose/mouth of the person to the cassette should be about 10 cm. Secure the cassette on the collar or lapel using spring clips or other similar devices. In all cases, orient the cassette so the open face of the cowl is pointing downward to avoid any particles entering the filter by precipitation. Remove the protective cap over the open face of the cowl and turn on the calibrated pump. Record the starting time, the initial flow rate, and all other relevant sample data on the field data sheet for the sample. Store covers and end plugs in a clean area (e.g., a closed bag or box) during the sampling period.

For sampling events lasting longer than 2 hours, in-field pump checks should be performed approximately every 2 hours. These periodic checks should include the following activities:

- Observe the sampling apparatus (filter cassette, pump, tripod, etc.) to determine whether it's been disturbed.
- Check the pump to ensure it is working properly and the flow rate is stable at the prescribed flow rate.
- Inspect the filter for overloading and particle deposition. Inspect the filter using a small flashlight. Look for particle adhesion or deposition on the side of the cassette and check the filter surface for accumulation of visible dust or smoke particles. If particle deposition on the inside of the cowl is observed, it may be necessary to ground the cowl to reduce static charge.

After the specified sampling period has elapsed, measure the ending flow rate and ending clock time on the data sheet. Turn off the pump and remove the cassette from the pump. Attach and secure a sample seal around each sample cassette in such a way as to assure that the end cap and

base plug cannot be removed without destroying the seal. Tape the ends of the seal together since the seal is not long enough to be wrapped end-to-end. Initial and date the seal.

#### 10. Sample Handling and Preservation

Package the cassettes so they will not rattle during shipment nor be exposed to static electricity. Place custody seals, dated and marked with the packager's signature, onto the shipping container. Do not ship samples in polystyrene peanuts, vermiculite, paper shreds, or excelsior. Tape sample cassettes to sheet bubbles and place in a container that will cushion the samples in such a manner that they will not rattle. For additional shipping requirements, see the project plan.

Ship the sealed cassette to the analytical laboratory under proper chain of custody procedures. No preservation of the cassette is required.

### QUALITY CONTROL and QUALITY ASSURANCE

#### Pre-Project Filter ("Lot") Blanks

Before samples are collected, two cassettes from each filter lot of 100 cassettes should be randomly selected and submitted for analysis. The lot blanks will be analyzed for asbestos fibers by the same method as will be used for field samples. The entire batch of cassettes should be rejected if any asbestos fiber is detected on any filter.

#### Field Blanks

Blank samples are used to determine if any contamination has occurred during sample handling. Prepare two blanks (from the sample lot used for field sampling) for the first 1 to 20 samples. For sets containing greater than 20 samples, prepare blanks as 10% of the samples. Filter blanks should be taken to a sampling location and prepared there. Remove the caps on the filter cassette and hold the cassette open for about 30 seconds. Close and seal the cassette as described in Section 9. Store blanks for shipment with the sample cassettes.

## REFERENCES

NIOSH 7400

NIOSH 7402

ISO 10312

OSHA Technical Manual

EPA SOP 2015

# LIBBY OU3 FIELD SAMPLE DATA SHEET (FSDS) SMOKE MONITORING STATIONARY AIR MONITOR

Station ID: \_\_\_\_\_ Field Logbook No: \_\_\_\_\_ Page No: \_\_\_\_\_

Station Comments: \_\_\_\_\_

GPS Coordinate System: UTM Zone 11 North, NAD83 datum, meters

X coord: \_\_\_\_\_ Y coord: \_\_\_\_\_ Elevation: \_\_\_\_\_ m

Data Item	Cassette 1	Cassette 2	Cassette 3	Cassette 4
Index ID	[affix label here]	[affix label here]	[affix label here]	[affix label here]
Field QC Type (circle one)	FS-(field sample)    FB-(field blank)	FS-(field sample)    FB-(field blank)	FS-(field sample)    FB-(field blank)	FS-(field sample)    FB-(field blank)
Pump ID Number				
Flow Meter ID Number				
Start Date (mm/dd/yy)				
Start Time (hh:mm)				
Start Flow (L/min)				
Stop Date (mm/dd/yy)				
Stop Time (hh:mm)				
Stop Flow (L/min)				
Pump fault? (circle one)	Yes                  No	Yes                  No	Yes                  No	Yes                  No
Sample Air Volume (L)				
Field Comments				
Cassette Lot Number: _____				

For Data Entry Completion (Provide Initials)

Completed by:

QC by:



**Libby OU3 Phase IVA Field Mod #4**

**Bonita Lavelle** to: Robert.R.Marriam, robert.j.medler, john.d.garr  
Cc: brattin

10/05/2010 03:18 PM

From: Bonita Lavelle/R8/USEPA/US  
To: Robert.R.Marriam@grace.com, robert.j.medler@grace.com, <john.d.garr@mwhglobal.com>  
Cc: brattin@srcinc.com

Hi all

Attached please find field mod 4 that incorporates changes to the ABS script for exposure of ground based fire fighters to smoke.



**Signed field mod form:** OU3 Phase 4A Field Mod 4.pdf



**Attachment 1, revised script:** Attachment A ABS Scripts Rev 2 .pdf



**Attachment 2, SOP:** SOP EPA-LIBBY-01.pdf



**Attachment 3, FSDS:** stationary monitors FSDS.pdf

Thanks for your input. Please call if you have any questions.

Sincerely,

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